

WE CLAIM:

1. A triple-pump coherent anti-Stokes Raman scattering system for simultaneous measurements of temperature and species concentrations with high spatial and temporal resolution in a gaseous system, comprising:

(a) first and second pump lasers and first and second narrowband dye lasers for generating output beams near two substantially distinct wavelengths;

(b) a broadband dye laser;

(c) optical means for directing the output beam from said first pump laser onto said first narrowband dye laser and onto said broadband dye laser and for directing the output beam from said second pump laser onto said second narrowband dye laser;

(d) optical means defining a probe region for receiving a gaseous sample and for directing the output beams from said first pump laser, said first and second narrowband dye lasers and said broadband dye laser through said probe region; and

(e) detector means for detecting the optical output from said probe region.

2. The system of claim 1 wherein said first and second pump lasers are injection-seeded Nd:YAG lasers providing output beams respectively at about 532 nm and about 355 nm.

3. The system of claim 2 wherein said first and second narrow band dye lasers provide output beams respectively at about 554 nm and about 486 nm.

4. The system of claim 1 wherein the broadband dye laser generates an output beam at a frequency spectrum centered near 607 nm.

5. The system of claim 1 wherein said detector means includes a spectrometer and a charge coupled device.